

**III B.Tech II Semester Supplementary Examinations, April/May 2005**  
**MECHANICAL METALLURGY**  
**(Metallurgy & Material Technology)**

**Time: 3 hours****Max Marks: 70**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. With the help of neat sketches explain edge dislocations and screw dislocations.
2. (a) Explain the principle of working of Rockwell superficial hardness test with the help of a neat sketch. What are the advantages and limitations of this method?  
(b) In vicker's hardness test, on a steel sample the length of the diagonal of indentation was found to be 750 microns for a load of 30 kgs. Calculate vickers hardness number.
3. (a) Explain the difficulties and remedial measures associated with compression test.  
(b) What is Banschinger effect. Explain the Phenomenon of Banschinger effect with a neat sketch; taking in to consideration the various factors involved in it.
4. (a) Explain the factors for lowering ductile to brittle transition temperature of steel plates used for ship hulls.  
(b) Explain how the effect of small notches or cracks can be analysed in terms of fracture toughness.
5. (a) A sample of glass has a crack of half length 2mm. The young's modulus of glass  $70\text{GN/m}^2$  is and specific surface energy is  $1\text{J/m}^2$ . Estimate the fracture strength and compare it with its young's Modulus.  
(b) Explain Ductile-Brittle transition temperature in metals.
6. (a) Define fatigue limit. Explain an experimental set up and the procedure to find endurance limit of a metal.  
(b) What are the factors which affect the fatigue strength of materials?
7. (a) Explain how long time properties, of creep can be predicated by short time tests.  
(b) Explain Carson-Miller (L-M) parametric method.
8. What is the importance of N.D.T in engineering? Explain the following tests.
  - (a) X-Ray Radiography
  - (b) Liquid penetrant test.

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